1. OVERVIEW

Subject area	Production and Manufacturing Systems
Degree	Bachelor's Degree in Industrial Organisation Engineering
School/Faculty	*Faculty of Science, Engineering and Design*
Year	2º
ECTS	4.5 ECTS
Type	Compulsory
Language(s)	Spanish
Delivery Mode	On campus
Semester	Second

2. INTRODUCTION

Production and Manufacturing Systems aims to provide students with knowledge of the different production and manufacturing processes, their specifications and limits, and how to choose the most appropriate process to reach the end product from both a technological and financial point of view.

This subject provides basic theory and practical work so students learn about the manufacturing processes behind different parts that make up a set. This will serve graduates in their future careers when they have to manage projects from the beginning to the end product.

3. SKILLS AND LEARNING OUTCOMES

Basic skills (CB, by the acronym in Spanish):

- CB2 - Students can apply their knowledge to their work or vocation in a professional manner and possess the skills which are usually evident through the forming and defending of opinions and resolving problems within their study area.
- CB3 - Students have the ability to gather and interpret relevant data (usually within their study area) to form opinions which include reflecting on relevant social, scientific or ethical matters.
- CB4 - Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.
- CB5 - Develop the learning skills necessary to undertake further study in a much more independent manner. CB5: Students have developed the learning skills necessary to undertake further study in a much more independent manner.

Cross-curricular skills (CT, by the acronym in Spanish):

- CT02 - Independent learning: skills for choosing strategies to search, analyse, evaluate and manage information from different sources, as well as to independently learn and put into practice what has been learnt.
- CT03 - Teamwork: ability to integrate and collaborate actively with other people, areas and/or organisations to reach common goals.

- CT04 - Written/spoken communication: ability to communicate and gather information, ideas, opinions and viewpoints to understand and be able to act, spoken through words or gestures or written through words and/or graphic elements.
- CT05 - Analysis and problem-solving: ability to critically assess information, break down complex situations, identify patterns and consider different alternatives, approaches and perspectives in order to find the best solutions and effective negotiations.
- CT08. Entrepreneurial spirit: ability to take on and carry out activities that generate new opportunities, foresee problems or lead to improvements.

Specific skills (CE, by the acronym in Spanish):

- CE08 - Ability to use basic knowledge of production and manufacturing systems in industrial organisation processes.

Learning outcomes (RA, by the acronym in Spanish):

- RA1- Design and manage the manufacturing process in the production of the end product.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes (RA, by the acronym in Spanish)
CB02, CB03, CB04, CB05, CT02, CT03, CT04, CT05, CT08, CE08	RA1- Design and manage the manufacturing process in the production of the end product.

4. CONTENTS

This subject area deals with the following topics:

1. Fundamentals of production and manufacturing systems.
2. Dimensional metrology.
3. Forming and machining processes.
4. Automated and smart manufacturing.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Master lectures
- Collaborative learning
- Problem-based learning
- Project-based learning
- Learning based on laboratory work (laboratory, workshop and simulation environments)
- Case study
- Gamification
- Field work (field trips, work experience).

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of hours
Master lectures and practical seminars	22
Problem-solving	9
Case studies and field studies	6
Laboratory work	12
Debates and discussions	6
Learning contract (definition of interests, needs and objectives)	1
Autonomous learning	49.5
Tutorials	5
Knowledge tests	2
TOTAL	**112.5**

7. ASSESSMENT

The assessment systems, plus their weighting in the final grade for the subject area, are as follows:

On campus:

Assessment system	Weighting
On Campus tests to evaluate objectives of theory/practical learning (exam-type objective tests, written compositions, oral presentations, case studies/problem solving, debates, simulation tests)	50%
Off-site tests to assess theory/practical learning (case studies/problem-solving)	30%
Attitude assessment tests (attitude assessment rubrics, class participation)	10%
Self- and co-assessment (learning contract, learning outcomes)	10%

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities and the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

The reference publication to accompany this subject area is:

- Kalpakjian, S., & Schmid, S. R. (2008). *Manufactura, ingeniería y tecnología. 5ªEd*. Pearson educación.
- Perruchet, C. (2001). *Estimación de la Incertidumbre: medidas y ensayos*. AENORediciones.
- Groover, M. P. (1997). *Fundamentos de manufactura moderna: Materiales, procesos y sistemas*. México: Prentice hall.

This is the basic bibliography for this subject. There are also many more specific references to use.